

determined the whole of them, with the exception of *C. Calthæ*, *xanthocephalum*, *erythropus*, *obscurum* and *nigriceps*. Heer has a species, *C. pulchellum*, found in Switzerland, which, from his insufficient description, I have been unable to identify. With the above exceptions I think I have noticed the whole of the European species hitherto known.

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IX.—*Characters of new Land Shells, collected by EDGAR L. LAYARD, Esq., in Ceylon.* By W. H. BENSON, Esq.

1. *Streptaxis Layardiana*, nobis.

Testa arcuato-rimata, depresso-ovata, abbreviata, lata, leviter striata, albido-cornea; spira subelevata, apice planulato, excentrico; sutura crenulata: anfractibus 5, convexiusculis, ultimo ad latus deviante, basi convexiuscula, lævi; apertura straminea, subtriangulari uniplicata, marginibus callo lamellam intrantem validam emittente junctis, dextro expanso reflexiusculo, antrorsum arcuato, superne profunde sinuato, columellari et basali reflexis, umbilico intus rugoso-striato.

Diam. major  $10\frac{1}{2}$ , minor 8, alt. 4 mill.

*Hab.* inter lapides ad verticem rupis Mehintali Insulæ Ceylon.

In one or two specimens the callus near the upper margin is inclined to form an obtuse tooth at the side of the sinus, which is much deeper than in *H. Perrotetiana*, Petit, from the Nilgherries.

A graphic account of the discovery is contained in Mr. Layard's Journal in page 235, vol. xi. of the 'Annals.' This and the following curious species, of a singular genus, capriciously distributed through the tropical regions of the globe, are the first which have been found in Ceylon. The head-quarters of the genus are in South America and Western Africa. The remaining species, of which the locality is known, are solitary in the Nilgherry Hills of South India, at Tavoy on the Tenasserim coast of the Bay of Bengal, in Cochin China, and in the Seychelles and Rodriguez, islands of the Southern Indian Ocean.

M. Petit de la Saussaye objects (Journ. de Conchyl. 1851, p. 369) to the reception of *Streptaxis* as a genus, considering it to be inadmissible in a zoological point of view; and he adduces as an argument for rejection the circumstance of its gradual change into *Helix*, through species which belong to the group, although deficient in the principal character of distortion. The same argument might be used against the reception of most other genera. *Bulimus* and *Achatina* have as little title to separation as this genus and *Helix*; and *Streptaxis* has equal claims

to acceptance with Lamarek's genus *Anostoma*, like which the mollusk, to use M. Petit's words, "arriving at a certain stage of growth, abandons in the formation of the shell the regular course followed by the animals of the genus *Helix*."

The separation of such a singular group is, at all events, a great convenience in conchological research.

## 2. *Streptaxis Cingalensis*, nobis.

Testa arcuatim rimato-perforata, depresso-ovata, solida, abbreviata, lata, obsolete costulato-striata, albido-cornea, subtus polita; spira elevatiuscula, sutura creulata, apice convexiusculo; anfractibus 6 convexis, ultimo ad latus deviante, basi convexa; apertura subtriangulari, 3-dentata, marginibus callo lamellam intrantem validam emittente junctis, dextro reflexo, antrorsum arcuato, unidentato, superne profunde sinuato, columellari reflexo, ad basin unidentato; umbilico intus striato, linea impressa circumscripto.

Diam. major 11, minor 8, alt. 5 mill.

*Hab.* in pago Hewagam Corle Insulæ Ceylon, inter rimas saxorum.

Nearly allied to the last, but differing in the dentition of the aperture, in the umbilicus, and in the less flattened form. The replication of the sinus at the top of the aperture simulates another tooth at right angles with the laminar plait on the parietes, a character observable also in *S. Perroteti*, and to which *S. Layardiana* also shows a tendency. It is intermediate between those two species in the dentition of the aperture, but wants the additional tooth which occurs at the base, within the aperture, in the first-named species, from which it is moreover much further removed in form than from *S. Layardiana*.

Mr. Layard has communicated the following note on the animal:—"Épiphragm glassy, animal yellow, with a red line on the back, extending up the two superior tentacles, at the tip of which the eyes are situated: all four tentacles clubbed; when crawling the shell is carried nearly level with the back."

The colouring of the animal reminds me of the hues observable in the *Pupæ* of the Isle of France, as well as in the Indian and Galle species, *P. bicolor* of Hutton. It has already been remarked by others that *Streptaxis* has an obvious affinity with the Mauritian *Pupa Pagoda* in the formation of the shell.

## 3. *Helix ceraria*, nobis.

Testa obtecte perforata, depressa, nitidula, cerea, radiatim rugoso-striata, striis spiralibus remotiusculis decussata, luteo-fulvida, versus apicem rubescente, spira convexiuscula, apice obtusato; anfractibus 4, superne planulatis, ultimo lato, carinato, subtus convexo; apertura magna, late lunata, peristomate simplici, acuto,

marginibus callo tenuissimo junctis, columellari arcuato, superne breviter reflexo, perforationem inconspicuam fere tegente.

Diam. major 20, minor 16, alt. 10 mill.

*Hab.* in agris altis Insulæ Ceylon "Horton Plains" dictis.

#### 4. *Helix Puteolus*, nobis.

Testa perspective umbilicata, orbiculato-depressa, lenticulari, supra spurca, albida, subremote radiato-lirata, subtus cornea, radiatim striata; spira planiuscula apice vix prominulo, sutura impressa; anfractibus  $5\frac{1}{2}$ , angustissimis, convexiusculis, arcte convolutis, omnibus filoso-carinatis, superne sulco carinaque secunda parallelibus munitis, ultimo subtus planiusculo, ad marginem umbilici medio-cris profunde excavati, cyathiformis, valde compresso; apertura angusta, securiformi, peristomate recto, acuto.

Diam. major  $5\frac{1}{2}$ , minor 5, axis  $2\frac{1}{2}$  mill.

*Hab.* in saxis ad portas "Balcadua" dictas, Insulæ Ceylon.

This little shell is singular on account of its sculpture, the narrowness of the whorls, and the sudden and deep excavation of the well-like umbilicus. Vide 'Annals,' vol. vii. p. 305.

#### 5. *Helix Mononema*, nobis.

Testa angustissime perforata, trochiformi, radiato-striata, corneo-albida, glabra, non nitida, translucente, spira conoidea, apice obtuso, sutura distincta; anfractibus  $6\frac{1}{2}$ -7, superne convexiusculis, filo unico, elevato, tenui, mediano cinctis, ultimo acute filoso-carinato, subtus subplanulato; apertura verticali, securiformi, peristomate recto, acuto, margine columellari brevi, verticali, reflexo, perforationem subtegente.

Diam. major 5, minor  $4\frac{1}{2}$ , axis 4 mill.

*Hab.* ad Heneratgodde.

Allied to the Himalayan *H. fastigiata*, Hutton, and to the Bengal *H. Barrackporensis*, Pfr., but well-distinguished by its more depressed form and by the filiform line, which, in addition to the keel on the last whorl, runs along the central part of each of the upper whorls. Mr. Layard had not been able to procure a second specimen.

#### 6. *Helix marcida*, nobis.

Testa subobtectate perforata, depressa, solida, superne oblique regulariter costulata, subtus læviori, sub epidermide fulvido-cornea albida; spira vix elevata, sutura impressa, apice obtusiusculo; anfractibus 6, lente accrescentibus, ultimo rotundato, subtus planulato, apertura sublata lunata, obliqua, peristomate recto, tenui, margine columellari oblique descendente, crassiusculo, superne breviter reflexo, perforationem subtegente.

Diam. major 14, minor 12, axis 8 mill.

*Hab.* in Insula Ceylon.

7. *Helix vilipensa*, nobis.

Testa aperte perforata, pervia, depressa, solidiuscula, pellucida, cornea, polita; spira convexiuscula, sutura vix marginata, apice obtuso; anfractibus 5, subplanatis, lente accrescentibus, ultimo rotundato, subtus convexiusculo; apertura late lunata, subobliqua, peristomate recto, acuto, margine columellari oblique descendente, expansiusculo, superne breviter reflexo; umbilico pervio.

Diam. major 8, minor 7, axis 4 mill.

*Hab.* ad rupem Mehintali.

A little *Naninæ*form *Helix* with no very prominent character, differing from Pfeiffer's *H. Perroteti* and other small *Helices* of the same group, with the exception of a small unnamed Nilgherry shell which is slightly larger, but otherwise not easily to be distinguished from it. From *H. Perroteti* it differs by its more convex spire, rounder periphery, and more open perforation.

8. *Helix perfucata*, nobis.

Testa vix perforata, depressa, translucente, purpureo-fusca, politissima, spira elevatiuscula, sutura submarginata, apice obtuso; anfractibus 4, convexiusculis, arcte convolutis, ultimo rotundato, subtus convexo; apertura lunata, vix obliqua; peristomate recto, acuto, margine columellari verticali, leviter reflexo, umbilico non pervio.

Diam. major 5, minor 4, axis 3 mill.

*Hab.* in pago Gallensi, inter saxa.

Remarkable for its deep clear purple-brown colour.

9. *Vitrina Edgariana*, nobis.

Testa valde depressa, tenuissima, subtus membranacea, politissima, pellucida, superne obsolete oblique striatula, lineis nonnullis spirilibus impressis ornata, lutescente-cornea; spira planiuscula, apice prominulo, sutura impressa; anfractibus 3 celeriter accrescentibus, planiusculis, ultimo ad periphæriam valde convexo; apertura obliqua, ovato-lunata.

Diam. major 10, minor 8, alt. 4 mill.

*Hab.* ad Columbo, Hangwelle, et Ratnapoora, insuper folia arbutorum.

Mr. E. Layard remarks, that "the mollusk is very long and attenuated, yellow and white. On touching it, it throws itself off the spot where it crawls, and twists and springs about in a most singular manner, often propelling itself several inches from its starting-point." I have recorded elsewhere a similar habit in a little fresh water shell, *Planorbis rotula*, nobis.

10. *Vitrina membranacea*, nobis.

Testa valde depressa, submembranacea, obsolete oblique striatula,

striis versus apicem confertissimis, pellucida, virente-cornea, polita, superne convexiuscula, apice planato, sutura vix marginata; anfractibus  $3\frac{1}{2}$ , rapide accrescentibus, ultimo antice lato, subtus planulato, ad periphæriam angustam rotundato; apertura obliqua, ovata, margine superiori prorsus arcuato.

Diam. major 11, minor 8, alt. 4 mill.

*Hab.* ad portas montanas Balcadua dictas, lapidibus adhærens.

### 11. *Achatina Veruina*, nobis.

Testa cylindraceo-turrita, valde elongata, sordide albida, inæqualiter striata, spira superne sensim attenuata, sutura impressa, crenulata, apice obtuso; anfractibus  $12\frac{1}{2}$ –13 angustis cylindricis, ultimo  $\frac{2}{11}$  longitudinis vix æquante; apertura verticali, truncato-ovali, peristomate recto, acuto, margine columellari leviter arcuato.

Long. 25, diam. 5 mill.

*Hab.* ad Nalande.

### 12. *Achatina pachycheila*, nobis.

Testa ovato-oblonga, striatula, striis exilissimis confertis, obsoletis, spiraleriter sub lente decussata, nitida fuscescente-cornea, translucente, spira elongata, subconica, apice obtuso, sutura leviter impressa; anfractibus 6, vix convexiusculis, ultimo  $\frac{2}{3}$  longitudinis vix æquante; apertura verticali, oblongo-ovata, peristomate intus albedo-marginata, columella præarcuata, margine basali incrassato.

Axis 11, diam. 5 mill.

*Hab.* ad Heneratgodde.

This little species of a group, which has so many representatives in Ceylon, the Nilgherries, and the damp woody mountains of North-eastern India, with a more slender form than *A. Oreas*, nobis, is well distinguished from the allied forms by its peculiar sculpture under the lens, and by the internal incrassation of the peristome, a feature which is also observable in the species *A. crassilabris*, nobis, from North-eastern India.

### 13. *Bulimus Panos*, nobis.

Testa rimata, ovato-oblonga, subrugose striata, cornea, spira elongato-conica, sutura mediocri, apice obtuso; anfractibus  $6\frac{1}{2}$  convexiusculis, ultimo  $\frac{2}{3}$  longitudinis vix æquante, antice subscedente, apertura ovata, edentula; peristomate expansiusculo, acuto, marginibus conniventibus, columellari breviter dilatato, albedo.

Long. 11, diam. 5 mill.

*Hab.* ad Nalande.

This shell has a Pupiform aspect.

### 14. *Pupa Muscerda*, nobis.

Testa rimata, ovato-oblonga, striatula, cornea, spira elongata, apice obtuso; anfractibus  $5\frac{1}{2}$ –6, convexiusculis, ultimo tertiam partem

testæ æquante, vix ascendente; apertura ovata, tridentata, peristomate expanso, acuto, marginibus conniventibus, columellari dilatato, albido, plica parietali 1, columellari 1, profundiusculis, deute palatali 1, depresso, obtuso.

Long. 4, diam.  $1\frac{1}{2}$  mill.

*Hab.* ad promontorium "Pedro" dictum.

Found by Mr. E. Layard in old posts, and on Palmyra trees (*Borassus flabelliformis*).

15. *Pupa Mimula*, nobis.

Testa rimata, ovato-oblonga, subcylindracea, oblique tenuiter plicatula, pallide cornea, apice obtuso, sutura profundiuscula; anfractibus 5, convexis, ultimo vix ascendente; apertura ovata, verticali, 5-plicata, peristomate tenui, expanso, marginibus callo tenui expanso junctis, plica 1 intrante, majuscula, parietali, 1 columellari, 1 basali profunda, 2 palatalibus profundis.

Long. 2, diam. 1 mill.

*Hab.* in vitibus ad Promontorium Pedronis.

A minute species nearly allied to, and somewhat larger than the Himalayan *P. Huttoniana*, nobis. It was taken in abundance by Mr. Layard.

16. *Cataulus Austenianus*, nobis.

Testa subperforata, ovato-pyramidata, solidiuscula, eleganter oblique costulato-striata, sericea, diaphana, saturate rubro-castanea, spira turrita, sutura impressa, apice acutiuseculo; anfractibus 8, convexiusculis, ultimo antice subascendente, carina basali, compressa, prominente, subfuniculata, antice non dilatata; apertura subcirculari, obliqua, sursum spectante, peristomate duplici, incrassato, saturate fusco-aurantiaco, interno continuo, breviter adnato, externo fornicatim patente reflexo, superne et ad columellam subauriculato-dilatato, canali basali aperto, intus vix strictiore, ad sinistram perforato: operculo spiraliter laminato, anfractus multos appressos reconditos exhibente, facie exteriori anfractus plures angustos mentiente.

Diam.  $13\frac{1}{2}$ , alt. 25 mill.

*Hab.* ad Heneratgodde in rimis saxorum.

Allied in form and size to *Cataulus pyramidatus*, Pfeiffer, but differs in sculpture, position of the canal, colour of aperture, &c. It was taken by Mr. Edgar L. Layard in the deep fissure of a limestone rock, among the vegetable mould, where it lay concealed under the surface, with the mouth downwards, among the roots of an ancient *Ficus Indica*. In some specimens the last whorl is more swollen than in others.

Mr. Layard has communicated the following description of the animal in a letter written on the spot:—

“The animal is dark brown, mottled, about 9 lines long, 5 broad; tentacles two, brilliant scarlet tipped with brown, 3 lines long, sharp-pointed; eyes two, black, situated at the outside of the tentacles. The mollusk is very slow in its motions, crawling with the shell plane over its back, resting on the operculum; this is round and fits into the mouth; it is retractile when the animal is much irritated, but does not close the siphon and canal; when crawling, the flesh of the mollusk does not touch the canal. After placing them in boiling water to clean, I thrust a needle into one and pierced the operculum accidentally; judge of my astonishment, when in attempting to withdraw the instrument, the operculum unfolded revolution after revolution till I counted nine!” Subsequently Mr. Layard counted nineteen whorls in one operculum; and he has aptly likened it to the horn toy, made to resemble a snake by slicing it spirally from end to end, so as to form a laminar centreless screw.

At the request of the discoverer, I have much pleasure in dedicating the species to his brother, the enterprising Oriental archæologist and traveller Dr. Austen Layard.

#### 17. *Cataulus decorus*, nobis.

Testa subperforata, elongato-turrita, solida, confertim costulato-striata, nitidiuscula, rufo-castanea, apice acutiusculo; anfractibus 8, convexiusculis, ultimo ad basin compresso-carinato, carina valde prominente, versus marginem funiculata, incrassata, antice vix dilatata; apertura verticali, circulari, peristomate incrassato, reflexo, breviter adnato, læte aurantiaco, ad basin subproducto, deorsum recedente; canali extus lato perforato; periomphalo magno: operculo ut in præcedente.

Diam. vix 10, axis 21 mill.

Hab. ad Ratnapoora.

Mr. Layard wrote regarding this species—“This was found under a rock with two others; animal brownish gray, foot livid. Tentacles pale orange, two; eyes sessile, two, black.”

Mr. Layard has, since his return to England, detected in the operculum of *Megalomastoma altum* a structure similar to that which obtains in these *Catauli*, and I have, since the communication of that circumstance, also observed it in the operculum of the Himalayan *Meg. funiculatum*, nobis.

#### 18. *Cyclophorus Parapsis*, nobis.

Testa late et perspective umbilicata, orbiculato-depressa, tenui, confertim striatula, olivacea, sub epidermide tenui albida; spira planiuscula, apice vix prominulo, sutura profunda; anfractibus 4 convexiusculis, ultimo cylindrico, leviter descendente, non dilatato; apertura subverticali, subcirculari, intus glaucescente; peristomate

continuo, breviter adnato, recto, simplice, acuto: operculo tenui, corneo, arcte spirato, medio concaviusculo, intus obtuse umbonali.  
 Diam. major 13, minor 10, alt. 5 mill.  
*Hab.* ad Damboul, ad verticem rupis, in rimis saxorum.

It differs from *C. loxostoma*, Pfeiffer (a large and handsomely marked variety of which was found on the same rock), in colouring, epidermis, depth of suture, narrower and deeper umbilicus, and the more circular and vertical aperture, which exhibits nothing of the diagonal departure from the axis observable in Pfeiffer's shell. The peristome also is acute and single, instead of being double, slightly expanded and thickened, as in that species, of which Mr. Layard's specimen is variegated with radiate and undulated chestnut stripes, and with a single band on a fulvous ground.

London, June 1853.

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X.—Notes on the Ornithology of Ceylon, collected during an eight years' residence in the Island. By EDGAR LEOPOLD LAYARD, C.C.S.

To the Editors of the *Annals of Natural History*.

GENTLEMEN,

Should you deem the accompanying notes on the birds of Ceylon worthy of a place in your Journal, they are at your disposal. I flatter myself that they will be found to contain a complete list of those birds as yet discovered in Ceylon. I have had the advantage of consulting with Mr. Blyth and Drs. Templeton and Kelaart, with each of whom I have been on terms of the closest intimacy, and we mutually communicated our discoveries. I have myself seen and shot most of the birds enumerated, in their native haunts, for whether walking, driving or riding, I always carried my telescope and collecting gun, and I have thus traversed the greater part of the island. Besides travelling, I have been some years stationed in the widely separated localities of Colombo, and Pt. Pedro in the neighbourhood of Jaffna, from which places I made frequent excursions into the jungle, for the purpose of collecting and observing the habits of birds and animals. The only parts I have left unvisited are Nuwera Elia and Batticaloa and their vicinities. In the former place Dr. Kelaart long resided and carefully investigated, as his list shows. From Batticaloa I have inspected small collections of birds; and the only part of Ceylon entirely unknown to either of us three is the Park country, which I had hoped to explore, but was pre-